The Polytech network is a French group of 13 Universities Polytechnic Schools of Engineering offering more than 80 specialties among 5 major domains, including: Biotechnology, Bioengineering, Food Science, Civil Engineering, Environmental Science, Electrical Engineering, Electronics Engineering, Computer Science, Applied Mathematics, Mechanical Engineering, Materials Science. More than 13,000 enrolled students are in the Polytech network that represents 5,500 graduates per year. 1,200 PhD students are also studying in the Polytech network. Finally more than 5,800 alumni are representing the Polytech Group in companies in France and all around the world.

As every school of engineering member of the Polytech group, Polytech Tours is a public school of engineering, component of the University of Tours (France). Polytech Tours has several accreditations, including the French « Commission du Titre d'Ingénieur », and the European accreditation EURACE. Polytech Tours is also a member of the French conference of business and engineering college (« Conférence des Grandes Ecoles »).

Polytech Tours includes 5 research and training areas: Urban & Regional Planning Engineering, Computer Science, Mechanical Engineering, Electronics and Energy, and Embedded Computing. In 2011, more than 10,700 engineering students have been enrolled, representing 2,100 graduates, per year. Notice that these five-year curricula confer the official qualification of Engineer (Master's degree).

Polytech Tours is hosting 4 research laboratories of the University of Tours, and 90 PhD students. 90 Faculty members (Professors and Assistant professors), 30 Administrative and Technical staff are permanent employees of Polytech Tours. More than 130 teaching and research staff from industry are involved in Polytech Tours.

From a pedagogical point of view, Polytech Tours aims at offering an education in compliance with short term industrial needs (technical skills ; internships ; economics and business courses). Our goal is to provide an education to assist engineers for future changeover by guaranteeing a high level of scientific knowledge. Polytech Tours has also strong links with innovation and research policies (R&D), for instance by proposing research projects in which students are involved in relationship with a research team and/or 6 « Centres for Research and Studies », jointly with industrial partner companies. Finally Polytech Tours is an international school of engineering. Students are strongly encouraged to spend either one of their five mandatory internships, or one study semester in a foreign country. To do this, several partner foreign universities are currently active, both in Europe and all around the world.
### Description of the Programme

**Duration**: 1 year (2 semesters)  
**Total ECTS Credits**: 60  
**Starting Date**: September

**Objectives**
- This Masters, taught entirely in English, aims to specialize students in the science and engineering of ceramics, metals, polymers/elastomers, and composites, with emphasis on a variety of aspects related to materials for electronics, biomaterials, nanotechnologies, mechanics, design, numerical modeling, reliability, life cycle analysis, processing and instrumentation, etc. This is an interdisciplinary Masters in Electronics and Mechanical Engineering teaching a variety of courses delivered by academic staff from the 2 laboratories and visiting guest researchers. This program will cater to the needs of both engineering and science students and engineers who can function effectively in the industry as well as possess the skills to assume leadership roles in industry, academia, and government.

The program’s objectives are to produce graduates who are able to:
- Apply the principles of materials science for undertaking advanced engineering and/or research projects; possess the skills to assume leadership roles in industry, academia, and government.
- Develop well qualified materials scientists and engineers who can function effectively in the technical arena as well as possess the skills to assume leadership roles in industry, academia, and government.
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**Admission Requirements**
- Resume with 240 European credits (ECTS), specialization in Electronic engineering and/or Mechanical Engineering.
- English Proficiency:
  - Level B2 of the Common European Framework of Reference for Languages or equivalent, i.e. minimum level required for non-native English speakers.
  - Paper based TOEFL score ≥ 577; Internet based TOEFL score ≥ 80; TOEIC score ≥ 780; TOEIC LRS score ≥ 5.
  - Cambridge C1 FCE or Cambridge C2 CAE.
- French Proficiency
  - Only required for everyday life; minimum recommended level: A2 of the Common European Framework of Reference for Languages or equivalent.

**Application Process and Deadlines**
- Application process and deadlines are available on the website:
  - [http://www.etsic.upt.fr](http://www.etsic.upt.fr)
- Tuition Fees
  - For students of the EME master program are about 6000 € for the whole year including an internship of 2.000 €. Candida
tes, at the moment of their final registration, an official certificate of research activity at the University of Tours or a research
  - lab at the University of Tours, providing a letter stating that their internship will be financed may pay only 5000 € of tuition fees.

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.E. 2: Acoustics and Vibrations</td>
<td>5</td>
<td>Heat transfer according to conduction, connection and radiation.</td>
</tr>
<tr>
<td>U.E. 3: Piezoelectric Materials and their Applications</td>
<td>5</td>
<td>Ultrasonic imaging techniques, non-destructive testing and evaluation (NDT, NDE); ultrasonic sensorat.</td>
</tr>
<tr>
<td>U.E. 4: Power Devices and Systems</td>
<td>5</td>
<td>Electrical and optical characterization for the determination of semiconductor properties and device performance.</td>
</tr>
<tr>
<td>U.E. 6: Behaviour of Polymers and Elastomers</td>
<td>5</td>
<td>Mechanical and physical properties of thin films/coatings for advanced applications.</td>
</tr>
<tr>
<td>U.E. 7: Research Internship</td>
<td>5</td>
<td>Internships in research laboratory or in an industrial environment.</td>
</tr>
</tbody>
</table>

**Fatigue**
- Course: 7h - Tutorials: 5h - Laboratories: 9h / 5 ECTS
- Fatigue of materials, Endurance limit, mean stress effects, low cycle fatigue, stress concentration effects. Mises law Introduction to Fracture mechanics, Plastic zone and fracture toughness. Fatigue crack propagation.

- Each student has to choose between courses U.E. 6a, U.E. 6b, U.E. 6c.